

**UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
Metal and Nonmetal Mine Safety and Health**

REPORT OF INVESTIGATION

**Surface Nonmetal Mine
(Limestone)**

**Fatal Electrical Accident
October 16, 2004**

**APAC-Missouri Inc.
Marshall Quarry
Marshall, Saline County, Missouri
Mine ID No. 23-00099**

Investigators

**Gary L. Cook
Supervisory Mine Safety and Health Inspector**

**Michael W. Marler
Mine Safety and Health Inspector**

**Stephen B. Dubina
Electronics Engineer**

**David L. Weaver
Supervisory Mine Safety and Health Specialist**

**Originating Office
Mine Safety and Health Administration
South Central District
1100 Commerce Street, Room 462
Dallas, Texas 75242-0499
Edward E. Lopez, District Manager**

OVERVIEW

On October 16, 2004, Hardney L. Rush, laborer, age 37, was fatally injured when a crane's hoist cable contacted an energized high-voltage power line. He received a fatal electrical shock while using both hands to steady a conveyor that the crane was lifting.

The accident occurred because safe operating procedures were not implemented before operating the crane near an energized high-voltage power line. The power line was not de-energized and no other precautionary measures were taken.

A risk assessment to identify all possible hazards and establish safe procedures was not conducted by the crew prior to starting this task.

GENERAL INFORMATION

Marshall Quarry, a crushed limestone operation, owned and operated by APAC-Missouri Inc., was located near Marshall, Saline County, Missouri. The principal operating official was Marvin Davis, plant manager. The mine normally operated one 12-hour shift per day, five days per week. Employees worked one 8-hour shift on Saturdays on an as-needed basis. Total employment was 15 persons.

Limestone was drilled and blasted from multiple benches in the pit and loaded into haul trucks by front-end loaders. The material was crushed, screened, and stockpiled. Finished products were sold for use in the construction industry.

The last regular inspection of this operation was completed on April 14, 2004.

DESCRIPTION OF THE ACCIDENT

On the day of the accident, Hardney L. Rush (victim) reported to the mine at 6:45 a.m. He attended a safety meeting at 7:00 a.m., his normal starting time. After the safety meeting, Rush was assigned to work with Richard Baker, vice-president, to place two conveyors at the plant. Baker decided to operate the crane that would lift and place the conveyors. Christopher Carey, plant operator; Brandon Clyde, quality control person; Charles Wright, quarry man; and Rush were directed to bring the conveyors from the shop and assist with lifting and placing them.

Wright used a front-end loader to place the first conveyor behind the crane. The first lift began about 9:00 a.m. as Baker rotated the crane boom counter-clockwise toward a 7200-volt power line situated about 23 feet from the right rear corner of the crane. Rush acted as the ground spotter for Baker and reported there was at least 8 feet of clearance as the crane hoist cable swung past the power line. About 9:30 a.m., the first lift was completed and Wright stayed with the conveyor to weld support legs under it.

Carey and Clyde used a front-end loader to move the second conveyor from the shop and placed it behind the crane. However, the conveyor was placed several feet farther from the crane than the first one had been and the hoist hook didn't center over the rigging ring. In order to align the hoist hook, Baker lowered the crane boom. About 10:30 a.m., Baker hoisted the conveyor and began to rotate the crane boom but he failed to either retract the boom or raise it. Even though three employees were on the ground around the crane, no one was located in a proper position to spot for Baker at the time of the accident.

As Baker rotated the crane boom counter-clockwise toward the power line, the conveyor began to rotate and sway. Rush grabbed the two adjustment screws on the tail section of the conveyor as Baker continued to rotate the crane. The crane hoist cable contacted the energized high-voltage power line while Rush was still holding the adjustment screws.

Baker heard shouts from the ground but continued to rotate the crane counter-clockwise until the hoist cable cleared the power line.

Carey immediately called to request emergency medical personnel. Cardio-pulmonary resuscitation was performed on Rush until emergency medical personnel arrived. The victim was transported to a nearby hospital where he was pronounced dead at 11:28 a.m. Death was attributed to electrocution.

INVESTIGATION OF THE ACCIDENT

MSHA was notified of the accident at 11:30 a.m., October 16, 2004, by a telephone call from Jeff Alexander, environmental health and safety director to Robert Seelke, supervisory mine safety and health inspector. An investigation was started that day. An order was issued pursuant to Section 103 (k) of the Mine Act to ensure the safety of the miners.

MSHA's accident investigation team traveled to the mine, made a physical inspection of the accident scene, interviewed employees, and reviewed documents and work procedures relevant to the accident. MSHA conducted the investigation with the assistance of mine management and employees.

DISCUSSION

Location of the Accident

The accident occurred at the on-site crushing and screening plant. The weather was warm and dry with winds reported at 3-5 miles per hour. The ground around the plant was dry.

Power Line

The 7200-volt energized power line was owned by Kansas City Power and Light and furnished power to both the mine and an associated asphalt plant. The power line was oriented generally north-south in the vicinity of the plant. The nearest power disconnect was located at the mine entrance. The phase conductors, 3/0 ACSR steel-reinforced lines, were located about 50 feet above the ground. The "A" phase conductor was scraped for a distance of about 20 feet where the crane hoist cable made contact with it. The phase to ground shock that Rush received was calculated to be 4160 volts.

Crane

The crane involved in the accident was a rubber-tired model HSP-8028 manufactured by Link-Belt Construction Equipment Company. It was equipped with a 60-foot telescoping boom and had a maximum lift capacity of 56,000 pounds. At the time of the accident, the boom was extended to 49 feet, at an angle of 39 degrees. The crane hoist cable had a scorched spot about 8 feet above the lifting hook. The only safety defect on the crane, a non-functional anti-two blocking device, did not contribute to the accident.

Conveyor

The section of conveyor was 60 feet long, 36 inches wide, and weighed 3,300 pounds. It was being placed as part of a new crusher installation.

Training and Experience

Rush had a total of 27 weeks of mining experience, all at this mine. He had received training in accordance with 30 CFR, Part 46. On the day of the accident, he had received one hour of task training during the first lift.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following causal factors were identified:

Causal Factor: Management policies and controls were inadequate. Safe work procedures were not initiated to ensure that miners were protected while working near energized high-voltage power lines.

Corrective Action: A risk assessment should be performed to identify all possible hazards and establish safe procedures prior to beginning any repair, maintenance, or construction tasks.

Causal Factor: Policies and administrative controls were inadequate and failed to assign a ground person to signal the crane operator during all phases of the lift. The crane operator was unable to observe the distance between the hoist cable and the power line.

Corrective Action: Establish procedures that require all crane operators to utilize a signal person when any lift is made. When lifts are made, require the use of tag lines. Monitor employees to ensure compliance with safe operating procedures.

CONCLUSION

The accident occurred because safe operating procedures were not implemented before operating the crane near an energized high-voltage power line. The power line was not de-energized and other precautionary measures were not taken. Tag lines were not used to steady the equipment being lifted. A ground person was not assigned to signal the crane operator during all phases of the lift.

A thorough risk assessment was not conducted by the crew prior to starting this task. Steps were not taken to identify all hazards and establish safe procedures to complete the lift.

ENFORCEMENT ACTIONS

Order No. 6238540 was issued on October 16, 2004, under the provisions of Section 103(k) of the Mine Act:

A fatal accident occurred at this operation on October 16, 2004, when a laborer was electrocuted while helping install a conveyor at the plant. This order is issued to ensure the safety of all persons at this operation and prohibits any work in the affected area until MSHA determines that it is safe to resume normal operations. The mine operator shall obtain approval from an authorized representative of the secretary of labor for all actions to recover and/or restore operations in the affected area.

This order was terminated on October 21, 2004, after the conditions that contributed to the accident no longer existed.

Citation No. 6230380 was issued on November 30, 2004, under the provisions of Section 104(d) (1) of the Mine Act for a violation of 30 CFR 56.12071:

A fatal accident occurred at this mine on October 16, 2004, when a crane hoist cable contacted a high-voltage power line. The victim, who was on the ground using both hands to steady a conveyor that the crane was lifting, was electrocuted. The crane boom hoist cable was within 10 feet of the energized high-voltage power line. Failure to de-energize the lines or take other precautionary measures prior to operating the crane in this location constitutes more than ordinary negligence and is unwarrantable failure to comply with a mandatory standard.

This citation was terminated on December 28, 2004. The operator adopted written crane operation procedures. Appropriate precautionary measures will be taken when power line clearance is less than 10 feet. Employees will be trained prior to future crane lifts.

Citation No. 6230381 was issued on November 30, 2004, under the provisions of Section 104(a) of the Mine Act for a violation of 30 CFR 56.16007(a):

A fatal accident occurred at this mine on October 16, 2004, when a crane hoist cable contacted a high-voltage power line. The victim, who was on the ground using both hands to steady a conveyor that the crane was lifting, was electrocuted. Taglines were not attached to the conveyor that was being guided or steadied while suspended.

This citation was terminated on December 28, 2004. The operator has adopted written crane operation procedures. Taglines will be used to guide or steady loads. Employees will be trained prior to future crane lifts.

Approved: _____

Edward E. Lopez
District Manager

Date: _____

APPENDIX A

PERSONS PARTICIPATING IN THE INVESTIGATION

APAC-Missouri, Inc.

Jeff Alexander	environmental health and safety director
Casey J. Castrop	environmental health and safety representative
Lee Cole	safety initiatives director
Ken Dalton	environmental health and safety manager

Mine Safety and Health Administration

Gary L. Cook	supervisory mine safety and health inspector
Stephen B. Dubina	electronics engineer
Michael W. Marler	mine safety and health inspector
David L. Weaver	supervisory mine safety and health specialist